

# Technical specifications for industry studies on the FCC cryogenic system

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Different scenarios of circular colliders are examined and a 100 TeV hadron collider in a 100 km long tunnel is the baseline of the overall infrastructure for the FCC study. Building such a machine requires the development of large unit-capacity cryogenic infrastructures (50 to 100 kW equivalent at 4.5 K) to cool down superconducting accelerator components. The cooling requirements are challenging with a very large refrigeration capacity up to 3 to 4 times larger than the present state-of-the-art and a non-conventional thermal load distribution with very large synchrotron radiation to the beam screens. An international collaboration team has evaluated these cooling capacity requirements, defined the reference cryogenic architecture and pre-designed the main cryogenic subsystems for such a machine. It is now time to assess industrial solutions for FCC cryoplants and to identify together the innovative technologies which have to be developed and assessed in the coming years to offer greater efficiency and more reliable operation for the FCC. The presentation will recall the state-of-the-art for Helium plants and detail the technical specifications for industry studies on the FCC cryogenic system.

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